Amendments to the Specification:

Please replace the paragraph beginning at page 13, line 21, with the following rewritten paragraph:

In this invention, the chilled coolant which is obtained from the liquid coolant by heat exchange as described above may be used as the liquid coolant in other heat exchangers as it is. In case the chilled coolant is passed through the line ~~2~~ 102 and further cooled by the refrigerator 13, the result will become preferable so that the chilled coolant will have a temperature which is appropriate to use in other heat exchangers. When the temperature of the chilled coolant is high, the liquid coolant thermocontroller 26 may be installed at the refrigerator 13 additionally to adjust the temperature of the chilled coolant. The reason for this additional installation is that the adjustment of the temperature consequently attained results in stabilizing the cooling and the condensation in the heat exchangers serving the purpose of supplying the chilled coolant.

Please replace the paragraph beginning at page 14, line 13, with the following rewritten paragraph:

The refrigerator 13, for example, supplies the chilled coolant via the line ~~3~~ 103 to the absorbing solvent cooler 8 which is attached to the acrylic acid absorbing column 5. Since the temperature of the absorbing solvent is preferred to be low for the purpose of high efficiency of acrylic acid absorption, the absorbing solvent is generally cooled in the heat exchanger before it is supplied to the acrylic acid absorbing column 5 and the liquid coolant for this cooling is introduced from another cooling system. In this invention, the power consumed for cooling can be decreased by using the chilled coolant mentioned above as the liquid coolant to be circulated to the cooler 8. When the chilled coolant is circulated to the cooler 8, the temperature thereof is properly in the range of 0 – 35° C, preferably in the range of 5 - 30° C. In order to prepare the chilled coolant which has appropriate temperature as mentioned above, it is preferable to install the liquid coolant thermocontroller 26 as stated above.

Please replace the paragraph beginning at page 14, line 30, through page 15, line 28, with the following rewritten paragraph:

The absorbing column 5 is generally provided with the circulation cooler 9 for cooling a

part of the heat entrained by the acrylic acid-containing gas supplied from the reactor 4 and enabled consequently to put to circulation part of the bottom of the column and, at the same time, supply the cooled acrylic acid absorbing solvent 21 from the top of the column, with the result that the temperature of the top of the column and the efficiency of acrylic acid absorption will be maintained at respectively prescribed levels. As the liquid coolant used in the circulation cooler 9, this invention allows use of the chilled coolant prepared as described above. Incidentally, the temperature of the chilled coolant prepared in the evaporator and/or adjusted by the liquid coolant thermocontroller is not always required to be equal to the temperature of the chilled coolant which is supplied to the coolers 8 and 9, etc. The chilled coolant to be circulated to the circulation cooler 9, for example, does not need to be limited to the chilled coolant which is cooled by the refrigerator 13. The chilled coolant withdrawn via the branch from the line ~~2~~ 102 extending from the evaporator 3 through the refrigerator 13 may be used instead. When the chilled coolant is circulated to the circulation cooler 9, the temperature thereof is properly in the range of 0 - 40° C, preferably 5 - 35° C. The chilled coolant which has undergone heat exchange in the circulation cooler 9 is introduced via the line ~~5~~ 105 and the chilled coolant which has undergone heat exchange in the cooler 8 is introduced via the line ~~4~~ 104 and they are mixed. It is preferable to mix the chilled coolant which has different temperature and to return to resultant mixed chilled coolant to the liquid coolant supply system 1 via the line ~~6~~ 106 and reuse as liquid coolant.

Please replace the paragraph beginning at page 15, line 29, through page 16, line 12, with the following rewritten paragraph:

The chilled coolant emanating from the refrigerator 13 can be advanced through the branch from the line ~~3~~ 103 and circulated to the condenser 10 attached to the solvent separating column 6 and used therein as the liquid coolant for heat exchange. As the chilled coolant to be used for this purpose, that which has been cooled by the refrigerator 13 proves favorable. When the chilled coolant is circulated to the condenser 10, the temperature thereof is properly in the range of 0 - 35° C, preferably 5 - 30° C. Incidentally, in order to prepare the chilled coolant which has appropriate temperature as mentioned above, the condenser 10 may be provided with the thermocontroller. The chilled coolant which has undergone heat exchange may be advanced

from the condenser 10 through the line ~~7~~ 107 and joined to the flow in the line ~~6~~ 106, again returned to the liquid coolant supplying system 1 and reused as the liquid coolant.

Please replace the paragraph beginning at page 16, line 13, with the following rewritten paragraph:

The process for producing acrylic acid usually involves the acrylic acid refining column 7 in addition to the acrylic acid absorbing column and the solvent separating column mentioned above. When the acrylic acid refining column 7 is involved in the process, the chilled coolant mentioned above may be used as the liquid coolant for the heat exchanger attached to the acrylic acid refining column 7 such as, for example, the condenser 11 attached to the refining column 7. When the chilled coolant is circulated to such a heat exchanger, the temperature thereof is properly in the range of 20 - 35° C, preferably 20 – 30° C. The vapor of acrylic acid is distilled from the acrylic acid refining column 7 through the top thereof and subsequently cooled by the condenser 11 attached to the refining column 7 to obtain acrylic acid. Meanwhile, the liquid 19 containing the by-product is recovered through the bottom of the column. Incidentally, the liquid coolant which has utilized in the condenser 10 attached to the solvent separation column or the condenser 11 attached to the refining column 7 is passed through the line ~~7~~ 107 and the line ~~8~~ 108 and mixed with the flow through the line ~~6~~ 106 and returned to the liquid coolant supplying system 1 and reused as the liquid coolant. When the apparatus for the production of acrylic acid mentioned above is connected to the methacrylic acid and/or (meth)acrylic esters plants 12, the liquid coolant mentioned above may be supplied as the liquid coolant for heat exchange in the plant 12 and the liquid coolant which has undergone this heat exchange advanced through the line ~~9~~ 109, combined with the flow through the line and returned again to the liquid coolant supplying system 1 and reused as the liquid coolant.

Please replace the paragraph beginning at page 17, line 10, through page 18, line 13, with the following rewritten paragraph:

One example of the chilled coolant used in the process for producing acrylic acid by the series of operations resorting to the reactor 4, acrylic acid absorbing column 5, solvent separating column 6, and refining column 7 has been installed. This invention allows the chilled coolant to be used in such heat exchangers installed in the plants other than the plant for producing acrylic

acid and the plants further connected to the acrylic acid plant such as, for example, the methacrylic acid and/or (meth)acrylic esters plants 12. When the amount of the heat of the chilled coolant calculated from the amount of the chilled coolant obtained by gasification is in excess of the total amount of the heat required for cooling in the heat exchangers attached to the process for producing acrylic acid, when the amount of the heat of chilled coolant is in excess amount because the chilled coolant has been further cooled by the refrigerator 13, and when the chilled coolant usable for cooling is in excess amount because it has been used only in a part of the heat exchangers involved in the process for producing acrylic acid, these excess of the chilled coolant can be effectively utilized in the plants mentioned above instead of being wasted. Moreover, the use of the chilled coolant results in not only reduction of energy consumption for cooling but also stabilizing the process of production by effective utilization of the latent heat generated by the gasification of propylene. For example, part of the chilled coolant from the line ~~3~~ 103 can be circulated to and used in the heat exchangers attached to the methacrylic acid and/or (meth)acrylic esters plants 12. The chilled coolant which has undergone heat exchange in this plant may be advanced through the line ~~9~~ 109 and mixed with the flow through the line 106. Particularly, when the acrylic acid is further esterified to produce the acrylic esters, the chilled coolant supplied to and used in the heat exchangers incorporated in the apparatus for producing esters brings about the advantage of simplifying the installation of piping for the transfer of the chilled coolant.

Please replace the paragraph beginning at page 18, line 20, through page 19, line 3 with the following rewritten paragraph:

Further, this invention may discard the chilled coolant after it has been used for heat exchange and it nevertheless is preferred to have chilled coolants of different temperature levels to be combined and returned to and reused in the liquid coolant supplying system 1 attached to the cooling tower, for example. The discard of the chilled coolant in a large volume is unfavorable from the environmental ~~presevation~~ preservation and economical point of view. This invention is also excellent in being capable of contributing to the preservation of environment owing to the cyclical use of the liquid coolant. The chilled coolant which is circulated to the liquid coolant supplying system 1 may be supplied via the line to the group of

liquid coolant using devices 29 and used therein and, after being used therein, forwarded via the line ~~10~~ 110 and combined with the flow in the line ~~6~~ 106 and circulated to the liquid coolant supplying system 1.

Please replace the paragraph beginning at page 25, line 27, through page 26, line 15 with the following rewritten paragraph:

The brine to be used as the liquid coolant is transferred from the liquid coolant tank 27 through the line ~~11~~ 111 to the liquid coolant heater 2 by means of the liquid coolant transfer pump 28. When the liquid coolant tank 27 is additionally provided with the liquid coolant thermocontroller 23, liquid coolant heater 2 which is provided in part of the line ~~11~~ 111 is no longer required. Particularly, however, the brine is capable of retaining the lower temperature than water. In case the apparatus which produces (meth)acrylic acid and/or (meth)acrylic ester and involves cyclic use of the chilled coolant, for example, has part thereof suspended from operation, there are cases where the temperature of the liquid coolant falls to extremely low level. In this case, therefore, it is preferable to make the liquid coolant temperature controlled in the range of 0-50° C by using the liquid coolant heater 2 and then introduce it into the evaporator 3 through the line ~~1~~ 101. When the brine is used, for example, by supplying brine having an ethylene glycol concentration of 30 mass % at the temperature in the range of 0 – 30° C to the evaporator 3, it makes possible to obtain the chilled coolant having the temperature in the range of -5 - 25° C.

Please replace the paragraph beginning at page 26, line 16, through page 27, line 15 with the following rewritten paragraph:

When the plant is provided with lines so installed that the chilled coolant used in any of the heat exchangers incorporated in the plant may be recovered in the liquid coolant tank 27, it makes possible to store the used chilled coolant in the liquid coolant tank 27 and transfer the liquid coolant from the tank using the liquid coolant transfer pump 28 which is installed in the line ~~11~~ 111 connected to the tank. When the liquid coolant tank 27 is disposed as described above, the pressure accumulating in the line for the liquid coolant transfer and the non-condensable gas possibly leaking in a minute amount into the liquid coolant may be separated. Particularly since the brine can be a chilled coolant of a lower temperature than water, the liquid

coolant may be circulated only partly to the evaporator 3 and used as the chilled coolant instead of being wholly circulated to the evaporator 3. For example, part of the liquid coolant flowing from the liquid coolant transfer pump 28 through the line ~~11~~ 111 is circulated to and cooled in the evaporator 3, forwarded via the line ~~2~~ 102 which is the line of the chilled coolant from the evaporator 3, and combined with the flow through the line ~~11~~ 111. The chilled coolant which has been obtained by being cooled as described above has a temperature different from the temperature of the liquid coolant flowing through the line ~~11~~ 111 and the line ~~2~~ 102. When the line ~~12~~ 112 is laid subsequently to the point of confluence, the chilled coolant can be forwarded through the line ~~12~~ 112 directly to the circulation cooler 9 attached to the acrylic acid absorbing column and used therein as the chilled coolant. The chilled coolant may be transferred through the line ~~12~~ 112 to the refrigerator 13, further cooled therein, and thereafter forwarded to the circulation cooler 9 attached to the acrylic acid absorbing column and used as the chilled coolant therein.

Please replace the paragraph beginning at page 29, line 15, with the following rewritten paragraph:

As the "means for using the chilled coolant in heat exchangers attached to the apparatus for producing acrylic acid or acrolein," the piping connected from the evaporator 3 to various heat exchangers, the lines ~~2, 3, and 11~~ 102, 102 and 111, and various heat exchangers may be cited. The pipe lines may include temperature adjusting means such as the liquid coolant thermocontroller 23 for the chilled coolant and the gas flow rate controller 25 as means for flow rate adjustment and they may be additionally provided with the refrigerator 13 for further cooling the chilled coolant and the liquid coolant thermocontroller 23.

Please replace the paragraph beginning at page 29, line 26, through page 30, line 2 with the following rewritten paragraph:

The apparatus for production according to this invention can include "means for circulating the chilled coolant used in the heat exchangers to means for preparing the chilled coolant." As concrete examples of this circulating means, the pipe lines for circulating the chilled coolant circulated to the heat exchangers to the liquid coolant supplying system 1, namely

the lines ~~4, 5, 6, 7, 8, 9, and 11~~ 104, 105, 106, 107, 108, 109, and 111. These pipe lines may be additionally provided with the liquid coolant transfer pump 28.

Please replace the paragraph beginning at page 31, line 13, with the following rewritten paragraph:

This chilled coolant was circulated to and used in absorbing solvent cooler 8, the condenser 10 attached to the solvent separating column, and the condenser 11 attached to the refining column. The used chilled coolant was introduced to the liquid coolant supplying system 1 and reused as liquid coolant. To the circulation cooler 9 attached to the acrylic acid absorbing column, the chilled coolant having the temperature of 27° C was directly supplied through the line ~~2~~ 102.